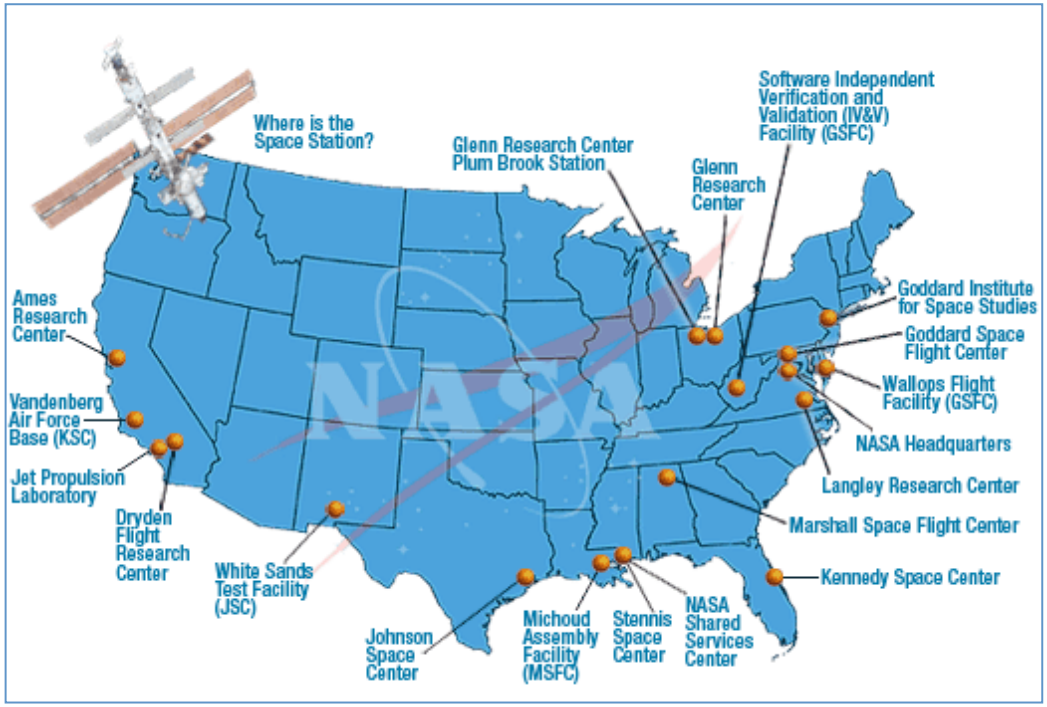
Risk to Resilience:
NASA's Framework for Addressing Climate Change Impacts & Adaptation



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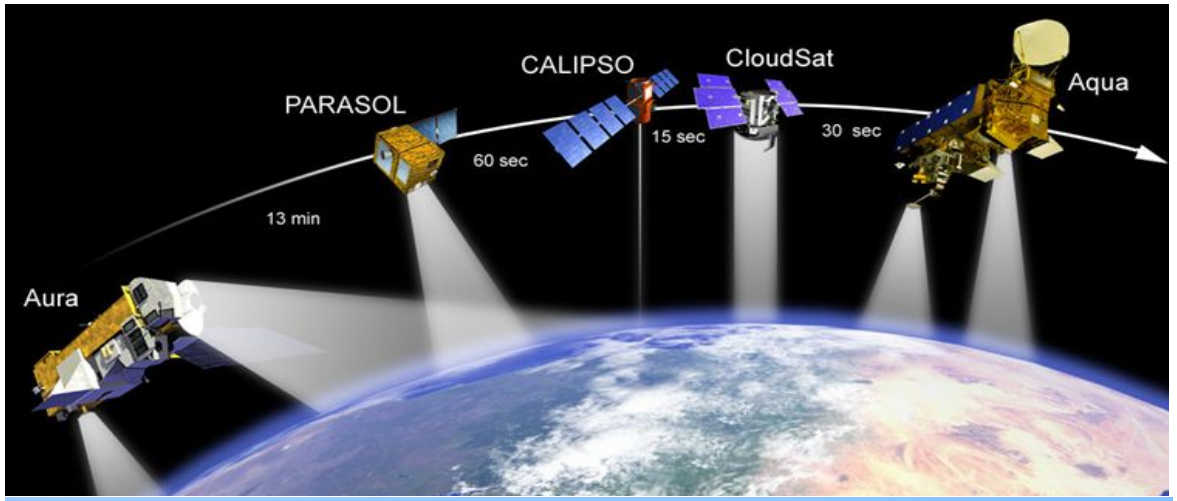
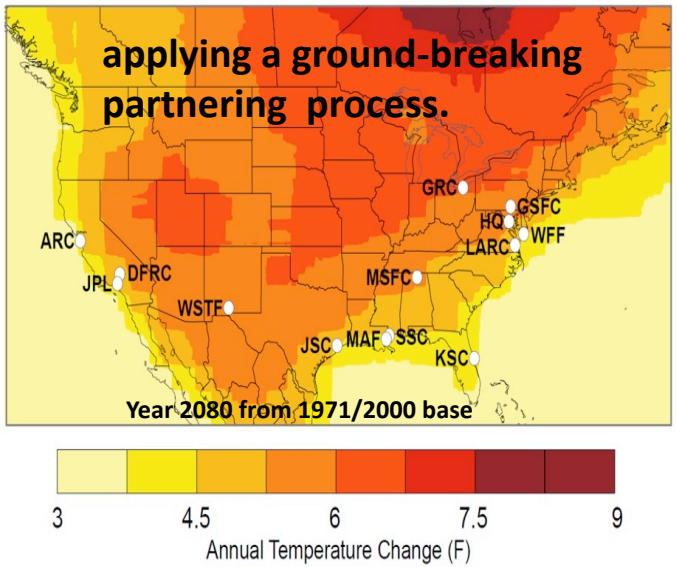
The Starting Point

- NASA climate science conclusively demonstrates that climate change is occurring.
- NASA's Office of Strategic Infrastructure is integrating NASA climate science data and the associated risk into its institutional planning and policy in order to ensure the resiliency and viability of our infrastructure to ensure mission capability in the future.

Leverage a unique perspective & renowned climate expertise... to quantify real risks…

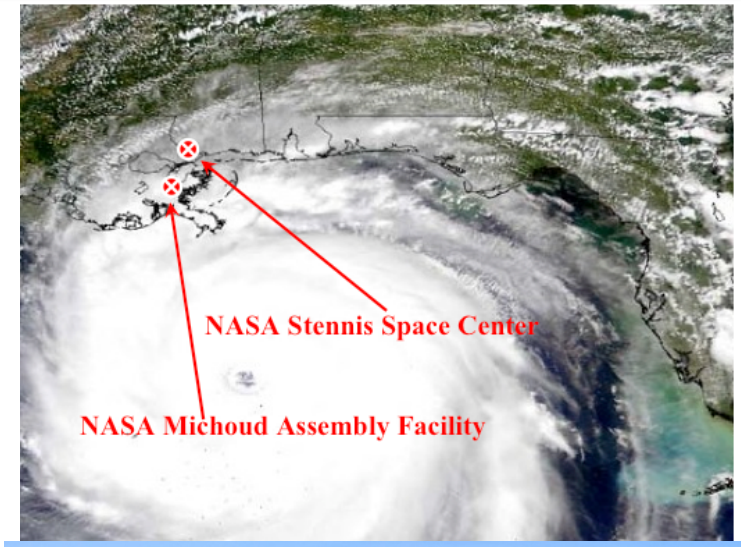




Risk and Sustainability

- Climate change risks and sustainability will push NASA to stretch the envelope of business as usual.
- Climate change impacts are a risk to NASA's infrastructure and therefore its Mission.
- Using the opportunity side of risk to design climate adaptive techniques that will include Green Engineering, Green Chemistry, Green Energy Management…
- Design and plan to ***requirements, outcomes and goals*** using climate change data and sustainable practices ***to drive innovation in infrastructure designs and management.***
  - **Design to Outcomes and Goals *not metrics***

Over 2/3rds of all NASA's constructed real property value is within 16 feet of sea level (≈$20B)



Extreme Weather Events

Devil's Gate Dam (about ¼ mile from JPL), showing the spillway over the dam (January 2005)

February 2007 KSC

AT LAUNCH Pad 39A, the external tank attached to orbiter Atlantis shows damage from hail during a strong thunderstorm that passed through Kennedy Space Center on Feb. 26.

Next Steps

NASA's Office of Strategic Infrastructure will make changes to require incorporation of climate change data and sustainable approaches in:

- Master planning efforts
- Construction of Facilities projects
- Environmental Management Systems
- Permitting (e.g., storm water)
- Logistics
- Across ***all*** of our portfolios